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jc781 U.S. PTO

**UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
600.1048Total Pages in this Submission
44**TO THE ASSISTANT COMMISSIONER FOR PATENTS**Box Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

FOLDING CYLINDER WITH EXPANSION SEGMENT

and invented by:

William Bellis SOMERSIf a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 9 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☐ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Microfiche Appendix (if applicable)
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if drawings filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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44

Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☒ Formal Number of Sheets 3
- b. ☐ Informal Number of Sheets _____
4. ☒ Oath or Declaration
- a. ☐ Newly executed (original or copy) ☒ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☒ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy (identical to computer copy)
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(B) Statement (when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure Statement/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail (Specify Label No.): EL 515148837US

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44

Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Additional Enclosures (please identify below):

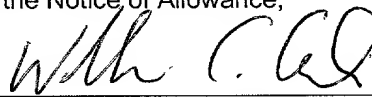
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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	13	- 20 =	0	x \$18.00	\$0.00
Indep. Claims	2	- 3 =	0	x \$78.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$690.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$690.00

- ☒ A check in the amount of \$690.00 to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 50-0552 as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of _____ as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).


Signature

Dated: April 18, 2000

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CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)Applicant(s): **William Bellis SOMERS**

Docket No.

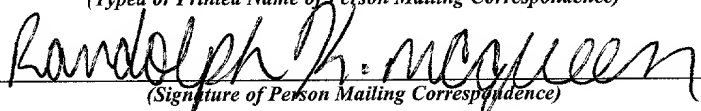
600.1048Serial No.
To Be AssignedFiling Date
HerewithExaminer
To Be AssignedGroup Art Unit
To Be AssignedInvention: **FOLDING CYLINDER WITH EXPANSION SEGMENT**

I hereby certify that this **New Utility Patent Application and Accompanying Documents**
(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under
37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on
April 18, 2000
(Date)

Randolph K. McQueen

(Typed or Printed Name of Person Mailing Correspondence)



(Signature of Person Mailing Correspondence)

EL 515148837US

("Express Mail" Mailing Label Number)

Note: Each paper must have its own certificate of mailing.

FOLDING CYLINDER WITH EXPANSION SEGMENT

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates generally to folders for printing presses and more particularly to a folding cylinder for a cross-folder.

2. Background Information

10 Web printing presses print a continuous web of material, such as paper. In a folder of the printing press, the continuous web then is cut into signatures in a cutting unit and folded. One possible fold to the resulting signatures is a cross-fold perpendicular to the direction of movement of the signatures. A tucking cylinder generally will hold a lead edge of a signature with a pin or gripper, either before or after the signature has been cut from the web. A tucking mechanism in the tucking
15 cylinder may then tuck the signature at a mid-point into a jaw of a jaw cylinder or into folding rolls so as to provide a cross-fold.

U.S. Patent Nos. 5,102,111 and 5,484,270 for example disclose cross-folding
20 folders having tucking cylinders. A web is received between a cutting cylinder and the tucking cylinder to form signatures, the lead edge of the signatures being held by pins. Tucking blades in the cylinders tuck the signatures into jaws of a jaw cylinder.

U.S. Patent No. 6,038,974, which is not necessarily prior art to the present
invention, discloses a cross folder for receiving signatures in grippers. The folder thus
could be used with either a web or sheet-fed printing press. A jaw cylinder and
tucking cylinder combination provide the cross-fold.

25 For cutting webs and tucking and transporting signatures, it is often desirable to vary the outer effective diameter of the tucking cylinder to permit proper processing of variable-thickness signatures. Signature width may vary significantly depending on the desired end product. It thus has been known to provide so-called

expansion segments on a tucking cylinder, the expansion segments being adjustable by a cam/spring mechanism to vary the effective outer diameter of the tucking cylinder.

However, it has been found that these expansion segments or their supports can be damaged easily, especially during paper jams on one side of the pin cylinder, for example the work side or the gear side.

BRIEF SUMMARY OF THE INVENTION

An object of the present invention is to provide a folding cylinder with an improved expansion segment.

The present invention provides a folding cylinder comprising:

a frame having a work-side support and a gear-side support;

at least one expansion segment for providing an effective diameter of the cylinder, the expansion segment being located between the work-side support and the gear-side support and spaced apart from at least one of the work-side support and the gear-side support; and

an actuating device for contacting the at least one expansion segment and setting the effective diameter.

By being spaced apart from the work-side or gear-side support, space is provided to allow for a non-even depression of the expansion segment in the event of paper jams acting on only one side of the cylinder. Thus, paper jams impacting the expansion segment unevenly need not damage the expansion segment.

The expansion segment preferably includes an outer section and a plurality of J-shaped brackets connected to the outer section. Preferably, a first J-bracket is spaced apart from the work-side support and a second J-bracket is spaced apart from the gear-side support. A third J-bracket may be spaced between the first and second J-brackets.

An end of the J-shaped brackets located opposite the outer section can interact with eccentrics on a camshaft, a rotational angle of the camshaft being adjustable

through a worm gear mechanism.

The frame also includes a tie support between the gear-side and work-side supports. Preferably, a plurality of springs on the tie support force the expansion segment radially outwardly. The J-shaped brackets thus may be forced against the eccentrics. By selective rotation of the cam shaft, the effective diameter thus may be set.

Preferably, a space is provided between the expansion segment and the frame both on the gear-side and the work-side. A foam piece preferably is provided in each space, so as to prevent axial movement of the expansion segment except during paper jams. The foam piece most preferably is coated on a frame contact side with a friction-reducing substance, such as TEFLON. The foam piece may be pre-cut to match a profile of a J-bracket and may be pre-applied to the J-bracket by adhesive on an adhesive side opposite the contact side.

The folding cylinder preferably is a pin or pin and tucking cylinder of a cross-folder.

The present invention also provides a method of manufacturing a folding cylinder comprising the steps of:

providing an expansion segment between a folding cylinder frame having a work and gear side; and

spacing the expansion segment from the frame so as not to contact the frame.

The method preferably includes placing foam pieces between the expansion segment and the frame.

The terms work-side and gear-side as used herein are for descriptive purposes, and as defined are interchangeable with the terms first and second, respectively.

“Cylinder” as defined herein can be any rotating body.

“Expansion segment” as defined herein is a part of a cylinder which presents itself at an outer section of the cylinder and is adjustable to define an effective diameter of the cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the present invention is described below by reference to the following drawings, in which:

Fig. 1 shows a side view of the folding cylinder of the present invention interacting with a jaw cylinder;

Fig. 2 shows a perspective view of a part of the folding cylinder, with the gear side removed for clarity; and

Fig. 3 shows a front view of the part of the cylinder in Fig. 2.

DETAILED DESCRIPTION

Fig. 1 shows a side view of a schematically-depicted folding cylinder 10 having pins or grippers 12 for holding a lead edge of a web or signature 1. If a web is held, a cutting cylinder interacts with folding cylinder 10 so as to form signature 3. Folding cylinder 10 also has tucking blades 14, which can fold signature 3 at a mid-point, as shown. The fold can be accepted by a jaw 22 of a jaw cylinder 20, or could be accepted by a pair of nipping rollers.

Cylinder 10 also includes expansion segments 16 spaced between the pins and tucking blades. An outer surface 18 of segments 16 may define an effective diameter of cylinder 10.

Expansion segments 16 are shown in more detail in Figs. 2 and 3, which show a section of folding cylinder 10 of Fig. 1. A rotating frame 30 of cylinder 10 includes a gear-side support 32, a work-side support 36 and a tie support 34 fixedly connected between the supports 32 and 36. The tie support 36 provides strength to the frame and includes spring support members 37, 38, 39, which preferably are integral with tie support 36.

Supported in gear-side support 32 and work-side support 36 is a camshaft 40 having eccentrics 41, 42, 43. An end 44 of camshaft 40 may be keyed to a worm drive for setting an angular position of camshaft 40 about its axis.

Eccentrics 41, 42, 43 interact with J-brackets 51, 52, 53 respectively of

Expansion segment 16 thus is forced radially outwardly with respect to frame 30 by the action of springs 61, 62, 63, but is retained by the interaction of J-brackets 51, 52, 53 against eccentrics 41, 42, 43.

The selective rotation of camshaft 40 can change the eccentric angle, so that the eccentrics permit J-brackets 51, 52, 53 and outer section 54 to move radially inwardly or outwardly. An effective outer diameter of cylinder 10 thus may be set.

With the present invention, J-bracket 51 is spaced a distance d_1 apart from work-side support 36, and J-bracket 53 is spaced a distance d_2 apart from gear-side support 32.

Foam pieces 70, 71 may fit into these spaces to prevent contact between the respective parts. Foam pieces 70, 71 may be pre-cut to match a J-bracket profile and then are applied with pressure-sensitive adhesive to the J-brackets, with a friction-reducing coating being located on the contact surface with supports 36, 32, respectively. However, the foam and any friction-reducing coating may also be pre-applied to a side of the J-brackets, for example through spraying. The friction-reducing coating helps permit adjustment of expansion segment 16 and preferably is made of TEFLON.

The spacing d1, d2 permits segment 16 to slightly move in the event that a paper jam or other obstruction depresses segment 16 unevenly. For example, if a wad of paper or mill splice passes through a pin-jaw cylinder interface only near the work-side support 36, spring 61 compresses, while spring 63 does not. Due to distances d1, d2, the expansion segment 16 can rotate slightly without damage to the expansion segment 16, compressing the upper part of foam piece 70 and the lower end of foam piece 71. Once the obstruction passes, expansion segment 16 can return to its normal

position.

The spacings or distances d_1 and d_2 may be, for example, 2 mm. The foam, which is compressible, helps keep the spacings free of dust, paper and grease.

WHAT IS CLAIMED IS:

1. A folding cylinder comprising:

a frame having a work-side support and a gear-side support;
at least one expansion segment for providing an effective diameter of the cylinder, the expansion segment being located between the work-side support and the gear-side support and spaced apart from at least one of the work-side support and the gear-side support; and

an actuating device for contacting the at least one expansion segment and setting the effective diameter.

2. The folding cylinder as recited in claim 1 wherein the at least one expansion segment is spaced-apart from both the work-side support and the gear-side support.

3. The folding cylinder as recited in claim 1 wherein the expansion segment includes an outer section and a plurality of J-shaped brackets connected to the outer section, a first J-bracket being spaced apart from the work-side support and a second J-bracket being spaced apart from the gear-side support.

4. The folding cylinder as recited in claim 3 wherein an end of the J-shaped brackets located opposite the outer section interacts with eccentrics on a camshaft, a rotational angle of the camshaft being adjustable.

5. The folding cylinder as recited in claim 1 wherein the frame includes a tie support between the gear-side and work-side supports, and further comprising a plurality of springs on the tie support for forcing the expansion segment radially outwardly.

6. The folding cylinder as recited in claim 1 further comprising a foam piece in a space between the expansion segment and the at least one of the gear-side and work

side supports.

7. The folding cylinder as recited in claim 2 further comprising foam pieces between the expansion segment and the work-side support and between the expansion segment and the gear side support.

8. The folding cylinder as recited in claim 3 further comprising a foam piece attached to a side of the first J-bracket.

9. The folding cylinder as recited in claim 8 wherein the foam piece covers the side in its entirety.

10. The folding cylinder as recited in claim 6 wherein the foam piece includes a friction-reducing coating.

11. The folding cylinder as recited in claim 1 wherein the cylinder is a pin cylinder of a cross-folder.

12. A method of manufacturing a folding cylinder comprising the steps of:
 providing an expansion segment between a folding cylinder frame having a work and gear side; and
 spacing the expansion segment from the frame.

13. The method as recited in claim 12 further comprising applying foam to the expansion segment.

ABSTRACT

A folding cylinder includes a frame having a work-side support and a gear-side support, at least one expansion segment for providing an effective diameter of the cylinder, the expansion segment being located between the work-side support and the gear-side support and spaced apart from at least one of the work-side support and the gear-side support, and an actuating device for contacting the at least one expansion segment and setting the effective diameter.

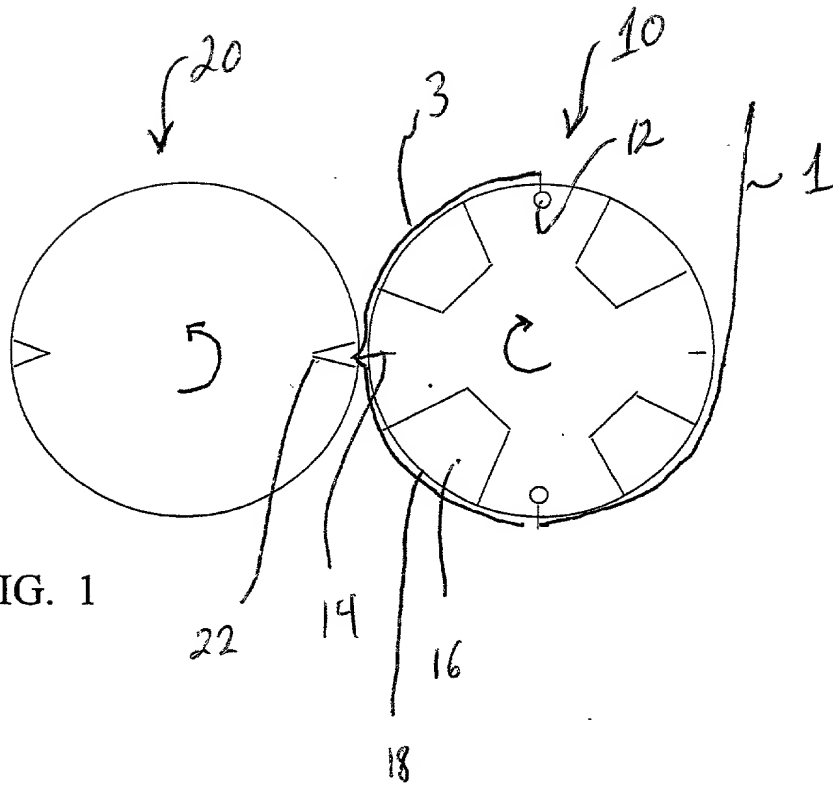


FIG. 1

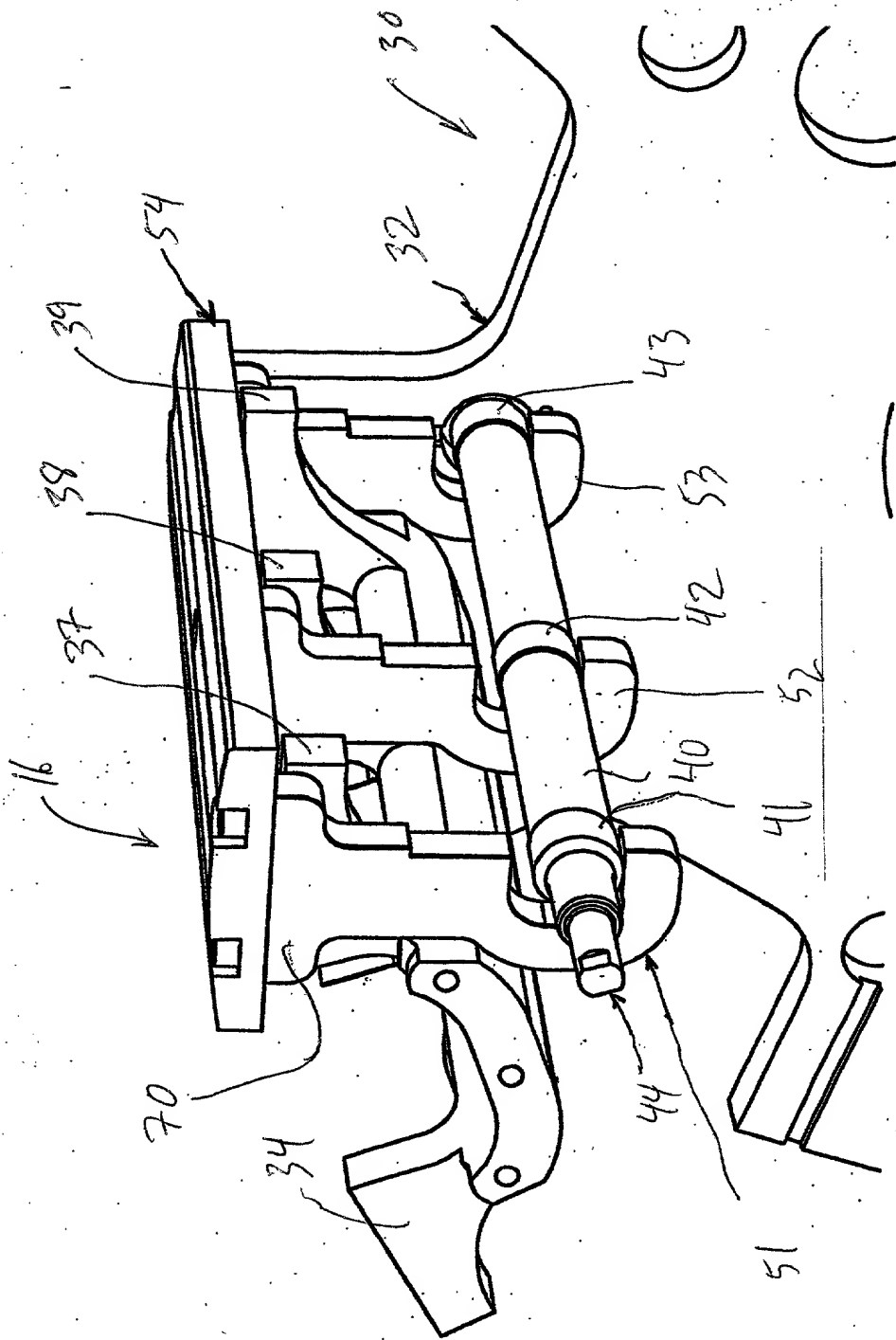


FIG. 2

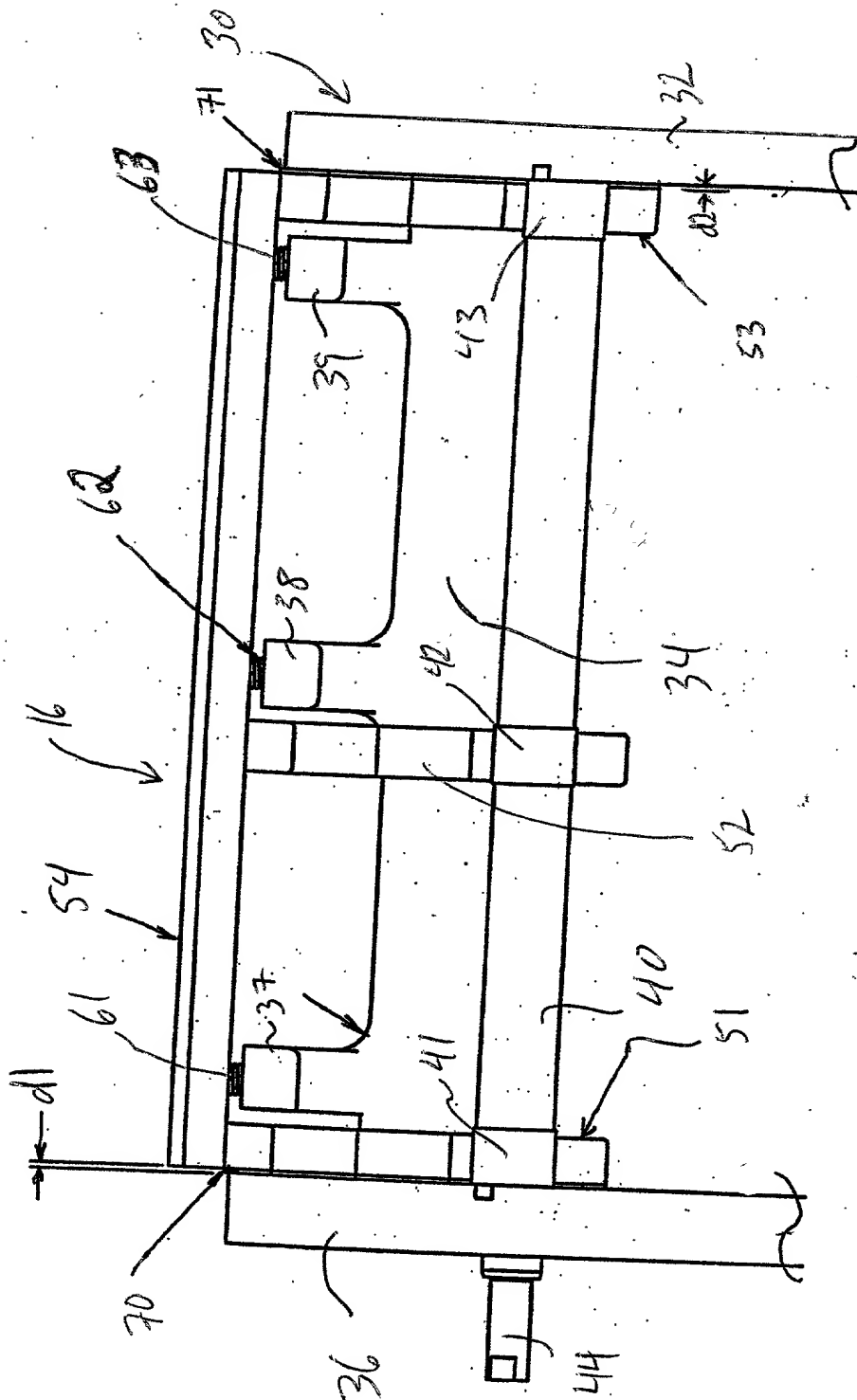


FIG. 3

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

FOLDING CYLINDER WITH EXPANSION SEGMENT, the specification of which (check one)

☒ is attached hereto
 was filed on _____ as Application Serial No. _____
 and was amended on _____ (if applicable)
 I hereby authorize and request our attorney, Davidson, Davidson & Kappel, LLC. of 1140 Avenue of the Americas, New York, New York 10036 to insert here in parentheses (Application number _____, filed _____) the filing date and application number of said application when known.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign and/or provisional application(s) for patent or inventor's certificate listed below and have also identified below any foreign and/or provisional application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR APPLICATION(S)			Priority claimed	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	_____	_____
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial Number)	(Filing Date)	(Status) (patented, pending, abandoned)
_____	_____	_____
(Application Serial Number)	(Filing Date)	(Status) (patented, pending, abandoned)
_____	_____	_____

And I hereby appoint Clifford M. Davidson, Registration No. 32,728, Leslye B. Davidson, Registration No. 38,854, Cary S. Kappel, Registration No. 36,561, William C. Gehris, Registration No. 38,156, Robert J. Paradiso, Registration No. 41,240, Jane E. Alexander, Registration No. 36,014, Scott L. Appelbaum, Registration No. 41,587, and Marc D Baker, Registration No. 44,017, my attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith; correspondence address: DAVIDSON, DAVIDSON & KAPPEL, LLC, 1140 Avenue of the Americas, 15th Floor, New York, New York 10036; Telephone: (212) 997-1028, Fax: (212) 997-1037.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Third Inventor's signature _____
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 Residence _____
 Citizenship _____
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Full name of joint
Inventor, if any _____

Second Inventor's signature _____
 Date _____
 Residence _____
 Citizenship _____
 Post Office Address: _____

Full name of joint
Inventor, if any _____

Fourth Inventor's signature _____
 Date _____
 Residence _____
 Citizenship _____
 Post Office Address: _____